

PATENT ABSTRACTS OF JAPAN

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(71)Applicant : KOKUSAI ELECTRIC CO LTD

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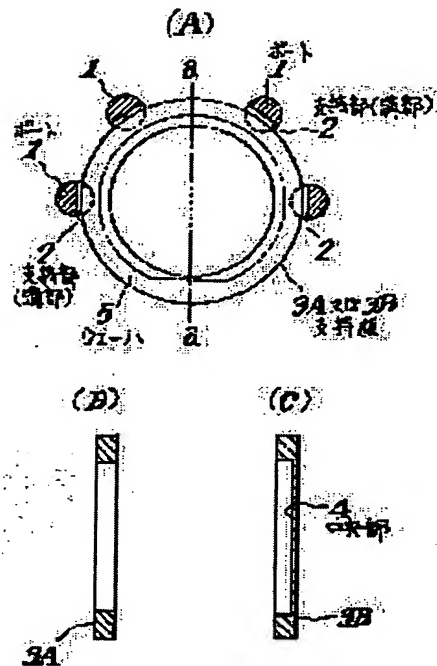
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(54) WAFER HOLDER

(57)Abstract:

PURPOSE: To hardly slip, crack, cut out a wafer, to reduce heat absorption in a furnace and to reduce a weight of a boat by installing an SiC support plate at a support of the boat, and holding a periphery of the wafer.

CONSTITUTION: A ringlike SiC support plate 3A is placed in a groove 2 of an SiC boat 1, and a periphery of a wafer 5 is held at the plate 3A. Thus, an own weight of the wafer 5 is dispersed to the plate 3A to be held, and even if the wafer 5 is heated to 1000°C or higher, a slip, a crack, a cutout hardly occurs. The degree of absorption of heat in a furnace to the plate 3A can be reduced, it can not only be reduced in weight as compared with the case that the weight of the boat is supported to a disclike support plate, but also no deformation occurs due to a high temperature heat treatment, since it is made of SiC, and since it is formed of a simple shape, it can be easily processed at a low cost.



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CLAIMS

[Claim(s)]

[Claim 1] The wafer holder characterized by for the shape of a ring and a center section installing the concave support plate made from SiC, and holding the wafer circumference at the supporter of a boat.

[Claim 2] The wafer holder of claim 1 which has a notch for wafer adsorption plate recess in a support plate.

[Claim 3] The wafer holder of claim 1 which has the section for positioning in a support plate.

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] (A) is the top view of this invention wafer holder laid in the boat. (B) is the a-a line sectional view of the 1st example in drawing 1 (A). Similarly (C) is the a-a line sectional view of the 2nd example in drawing 1 (A).

[Drawing 2] It is the expanded sectional view showing the condition of having used this invention wafer boat for the boat, and having laid the wafer.

[Drawing 3] It is the top view of the 3rd example.

[Drawing 4] It is the top view of the 4th example.

[Drawing 5] It is the top view of the 5th example.

[Drawing 6] It is the perspective view showing one example of the conventional wafer boat laid on the boat.

[Description of Notations]

1 Boat

2 Supporter (Slot)

3A Ring-like the support plate made from SiC

3B The support plate made from SiC of a concave [center section / 4]

5 Wafer

6A The notch for wafer adsorption plate recess

6B The notch for wafer adsorption plate recess

7 Positioning Section (Rod)

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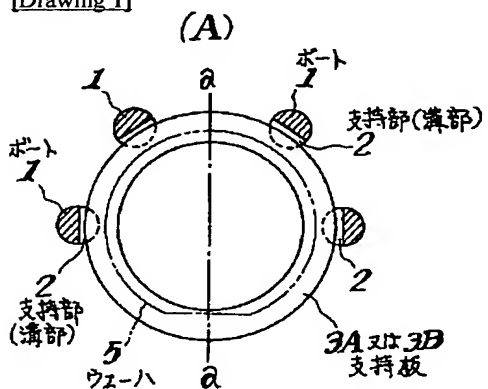
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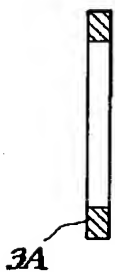
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DRAWINGS

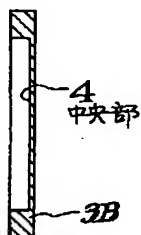
[Drawing 1]



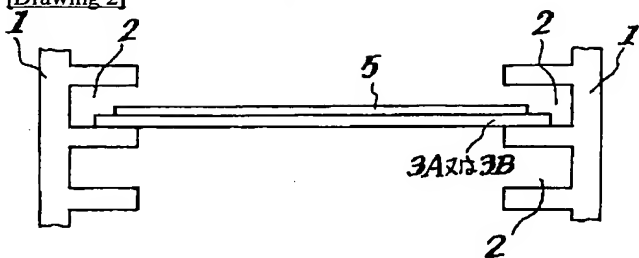
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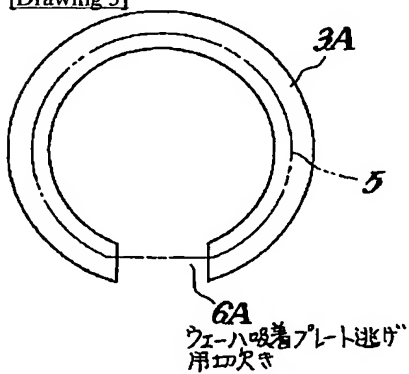
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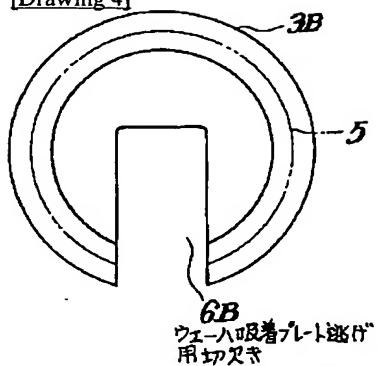
[Drawing 2]



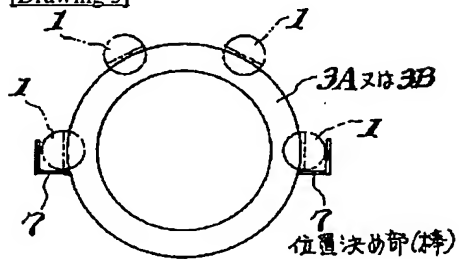
[Drawing 3]



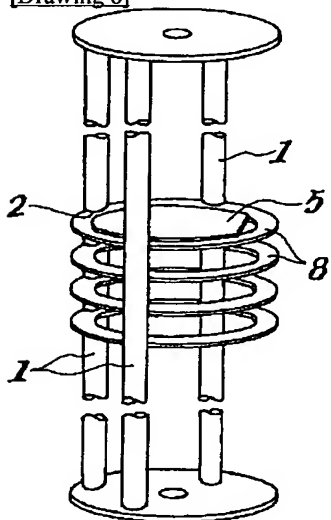
[Drawing 4]



[Drawing 5]



[Drawing 6]



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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to the holder which starts vertical mold semiconductor fabrication machines and equipment, especially supports a wafer.

[0002]

[Description of the Prior Art] When heat-treating a wafer at an elevated temperature, a slip is generated owing to a wafer self-weight etc. In order to solve this problem, the configuration of the wafer supporter of a boat is examined so that a wafer self-weight may not be applied locally. Drawing 6 is the perspective view showing one example of the conventional wafer holder laid in the boat, and is the wafer holder indicated by JP,61-247048,A. This conventional example is lightly made compared with the case where the heat in a furnace could make small the degree absorbed by the support plate, and a support plate with the disc-like weight of a boat is formed, by distributing the burden of the self-weight for supporting a wafer 5 by forming the supporter 8 of the shape of a circular ring which puts a wafer 5 on the slot 2 of a boat 1, and being hard coming to generate a slip and crack of a wafer, and a chip, and making the part of a support plate 8 in a circle.

[0003]

[Problem(s) to be Solved by the Invention] However, in the case of high temperature processing, if it is in the above-mentioned conventional example, in order to deform, the product made from SiC is used by the product made from a quartz. Since work expense becomes very expensive [the boat of the configuration which can fully distribute a self-weight in the present condition] since mechanical processing is very difficult for SiC, it is not put in practical use.

[0004]

[Means for Solving the Problem] This invention prevents slip generating of a wafer, and there is about the heat absorption in a furnace, and, of course, making weight of a boat light tends to offer the easy wafer holder of processing. [little] That is, this invention wafer holder comes to install the support plate made from SiC of a concave [center section / the shape of a ring, and] in the supporter of a boat. Since this invention wafer holder is such a configuration, the shape of a ring and a center section 4 install concave support plate 3 made from SiC A or 3B in the supporter 2 of a boat 1. Slip generating of a wafer can be prevented by holding the periphery of a wafer 5 to this support plate 3A or 3B. As well as it being few in the heat absorption in a furnace, and being able to make weight of a boat light, since the shape of a ring and a center section 4 are concave simple configurations, support plate 3A or 3B made from SiC can be processed easily.

[0005]

[Example] Similarly the top view of this invention wafer holder with which drawing 1 (A) was laid in the boat, the a-a line sectional view of the 1st example [in / in drawing 1 (B) / drawing 1 (A)], and drawing 1 (C) are the a-a line sectional views of the 2nd example in drawing 1 (A). The 1st example lays ring-like support plate 3 made from SiC A in the slot 2 of a boat 1, and holds the periphery of a wafer 5 to this support plate 3A (refer to drawing 2). In the slot 2 of a boat, the 2nd example lays support plate 3 made from SiC B of a concave [center section / 4], and the periphery of a wafer 5 is held at this support plate 3B (refer to drawing 2). Drawing 3 is the top view of the 3rd example. The 3rd example is an example which prepared notching 6A for wafer adsorption plate recess of a wafer conveyance machine in support plate 3A shown in drawing 1 (B). The wafer 5 which inserts a wafer adsorption plate into a boat and is laid on support plate 3A It is the case where it enables it to take out a wafer adsorption plate from a boat through notch 6A for recess, adsorbing with a wafer adsorption plate from the rear face, and adsorbing this wafer, and automatic transfer is made possible. Drawing 4 is the top view showing the 4th example. The 4th example is an example which prepared rectangle-like notch 6B for wafer adsorption plate recess in support plate 3B shown in drawing 1 (C), and makes the same operation as above-mentioned drawing 3 .

[0006] The shape of a ring and a center section 4 lay concave support plate 3 made from SiC A or 3B in the slot 2 of the boat 1 made from SiC conventionally used as they are shown in drawing 2 , since this invention wafer holders are the above configurations. Since the self-weight of a wafer can be distributed and held to support plate 3A or 3B by holding the periphery of a wafer 5 to this support plate 3A or 3B Even if it heats a wafer at 1000 degrees C or more, it is hard coming to generate a slip, a crack, and a chip. The heat in a furnace can make small the degree absorbed by the support plate by making the shape of a ring, and a center section 4 into a concave for a support plate. And deformation by high temperature processing cannot break out, and as well as the ability to do lightly compared with the case where a support plate with the disc-like weight of a boat is formed, since it is a product made from SiC, since it is a simple configuration, it can be processed easily, and it can carry out cheaply.

[0007] Drawing 5 is the top view of the 5th example. The 5th example comes to prepare the positioning rod 7 in the position of symmetry of support plate 3 made from SiC A of a concave [center section / 4 / the shape of a ring, and], or 3B. By considering as such a configuration, this wafer holder, i.e., support plate, 3A or 3B can be easily positioned on a boat 1, and can be laid in it, and a location gap stops being able to occur easily.

[0008]

[Effect of the Invention] Since the shape of a ring and a center section come to install the concave support plate made from SiC in the supporter of a boat as mentioned above according to this invention Even if it can distribute and hold the self-weight of a wafer to support plate 3A or 3B and heats a wafer at 1000 degrees C or more, a slip and a crack, It is few in the heat absorption in a furnace, and as well as the ability to make weight of a boat light, since the shape of a ring and a center section are concave simple configurations, support plate 3 made from SiC A or 3B can be processed easily, and it is hard coming to generate a chip and it can be carried out cheaply.

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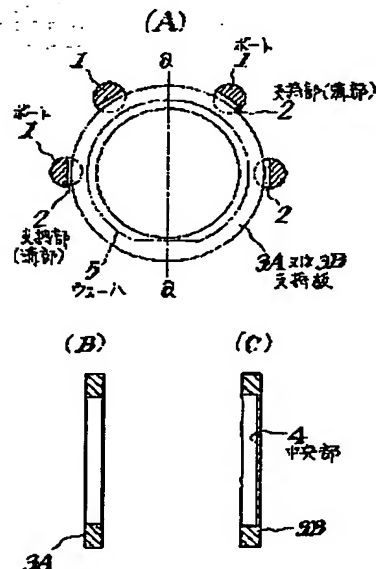
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(54) 【発明の名称】 ウェーハホルダ

(57) 【要約】

【目的】 ウェーハのスリップや割れ、欠けを防止し、炉内の熱吸収を少なく、かつボートの重畳を軽くすると共に容易に加工でき、安価に実施する。

【構成】 ボートの支持部に、リング状又は中央部が凹状のS i C製支持板を設置してなる。



【特許請求の範囲】

【請求項1】 ボートの支持部に、リング状又は中央部が凹状のS i C製支持板を設置し、ウェーハ周辺を保持することを特徴とするウェーハホルダ。

【請求項2】 支持板に、ウェーハ吸着プレート逃げ用切欠きを有する請求項1のウェーハホルダ。

【請求項3】 支持板に位置決め用部を有する請求項1のウェーハホルダ。

【発明の詳細な説明】

【0001】

【産業上の利用分野】 本発明は、縦型半導体製造装置に係り、特にウェーハを支持するホルダに関する。

【0002】

【従来の技術】 ウェーハを高温にて熱処理する場合、ウェーハ自重が原因でスリップが発生する。この問題を解決するため、ウェーハ自重が局部的にかからないようにボートのウェーハ支持部の形状を検討している。図6はボートに載置された従来のウェーハホルダの1例を示す斜視図で、特開昭61-247048号公報に記載されたウェーハホルダである。この従来例はボート1の溝部2にウェーハ5を載せる円盤状の支持部8を設けることにより、ウェーハ5を支持するための自重の負担が分散されてウェーハのスリップや割れ、欠けが生じ難くなり、又支持部8の部分を円盤状とすることにより炉内の熱が支持板に吸収される度合を小さくでき、かつボートの重量が円盤状の支持板を設けた場合に比べ軽くなる。

【0003】

【発明が解決しようとする課題】 しかし上記従来例にあっては高温処理の場合石英製では変形してしまうためS i C製を使用している。S i Cは機械的加工が非常に難しいので、現状では十分に自重を分散できる形状のボートは製作費が非常に高価となるので、実用化されていない。

【0004】

【課題を解決するための手段】 本発明は、ウェーハのスリップ発生を防止し、炉内の熱吸収を少なく、ボートの重量を軽くすることは勿論、加工の容易なウェーハホルダを提供しようとするものである。即ち、本発明ウェーハホルダはボートの支持部に、リング状又は中央部が凹状のS i C製支持板を設置してなる。本発明ウェーハホルダはこのような構成であるからボート1の支持部2にリング状又は中央部4が凹状のS i C製支持板3 A又は3 Bを設置し、この支持板3 A又は3 Bに、ウェーハ5の周辺部を保持することによりウェーハのスリップ発生を防止でき、炉内の熱吸収を少なく、かつボートの重量を軽くすることは勿論、S i C製の支持板3 A又は3 Bはリング状又は中央部4が凹状の単純な形状であるため容易に加工することができることになる。

【0005】

【実施例】 図1(A)はボートに載置された本発明ウェーハホルダの平面図、図1(B)は図1(A)における第1実施例のa-a線断面図、図1(C)は同じく図1(A)における第2実施例のa-a線断面図である。第1実施例はボート1の溝部2に、リング状のS i C製支持板3 Aを載置し、この支持板3 Aにウェーハ5の周辺部を保持する(図2参照)。第2実施例はボートの溝部2に、中央部4が凹状のS i C製支持板3 Bを載置し、この支持板3 Bにウェーハ5の周辺部を保持する(図2参照)。図3は第3実施例の平面図である。第3実施例は図1(B)に示す支持板3 Aに、ウェーハ搬送機のウェーハ吸着プレート逃げ用切欠き6 Aを設けた例で、ボート内にウェーハ吸着プレートを挿入し、支持板3 A上に載置されているウェーハ5を、その裏面からウェーハ吸着プレートにより吸着し、該ウェーハを吸着したままウェーハ吸着プレートを逃げ用切欠き6 Aを通してボートより搬出できるようにした場合であり、自動移載を可能にする。図4は第4実施例を示す平面図である。第4実施例は図1(C)に示す支持板3 Bに長方形のウェーハ吸着プレート逃げ用切欠き6 Bを設けた例で、上記図3と同様の作用をなすものである。

【0006】 本発明ウェーハホルダは上記のような構成であるから、図2に示すように従来の用いられているS i C製ボート1の溝部2にリング状又は中央部4が凹状のS i C製支持板3 A又は3 Bを載置し、この支持板3 A又は3 Bにウェーハ5の周辺部を保持することによりウェーハの自重を支持板3 A又は3 Bに分散して保持できるので、ウェーハを1000℃以上に加熱してもスリップや割れ、欠けが生じ難くなり、支持板をリング状又は中央部4が凹状とすることにより炉内の熱が支持板に吸収される度合を小さくでき、かつボートの重量が円盤状の支持板を設けた場合に比べ軽くなることは勿論、S i C製であるので高温処理による変形が起きず、かつ単純な形状であるため容易に加工することができ、安価に実施できる。

【0007】 図5は第5実施例の平面図である。第5実施例はリング状又は中央部4が凹状のS i C製支持板3 A又は3 Bの対称位置に位置決め棒7を設けてなる。このような構成とすることによりボート1に本ウェーハホルダ、即ち支持板3 A又は3 Bを容易に位置決めして載置することができ、位置ずれが起き難くなる。

【0008】

【発明の効果】 上述のように本発明によればボートの支持部に、リング状又は中央部が凹状のS i C製支持板を設置してなるので、ウェーハの自重を支持板3 A又は3 Bに分散して保持でき、ウェーハを1000℃以上に加熱してもスリップや割れ、欠けが生じ難くなり、炉内の熱吸収を少なく、かつボートの重量を軽くすることは勿論、S i C製支持板3 A又は3 Bはリング状又は中央部4が凹状の単純な形状であるため容易に加工することが

でき、安価に実施できる。

【図面の簡単な説明】

【図1】(A)はボートに設置された本発明ウェーハホルダの平面図である。(B)は図1(A)における第1実施例のa-a線断面図である。(C)は同じく図1(A)における第2実施例のa-a線断面図である。

【図2】ボートに本発明ウェーハポートを用いてウェーハを載置した状態を示す拡大断面図である。

【図3】第3実施例の平面図である。

【図4】第4実施例の平面図である。

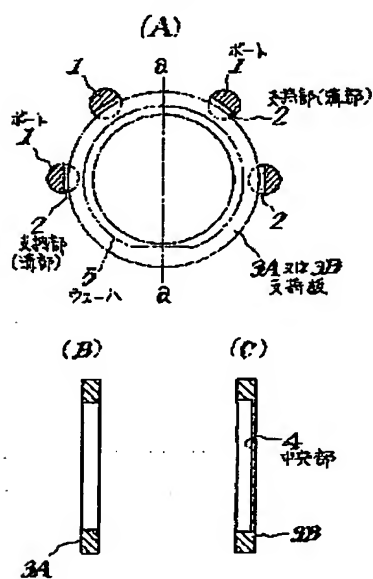
【図5】第5実施例の平面図である。

*【図6】ボート上に載置された従来のウェーハポートの1例を示す斜視図である。

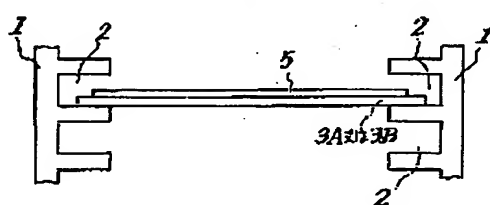
【符号の説明】

- 1 ボート
- 2 支持部（溝部）
- 3A リング状のSiC製支持板
- 3B 中央部4が凹状のSiC製支持板
- 5 ウェーハ
- 6A ウェーハ吸着プレート逃げ用切欠き
- 6B ウェーハ吸着プレート逃げ用切欠き
- * 7 位置決め部（棒）

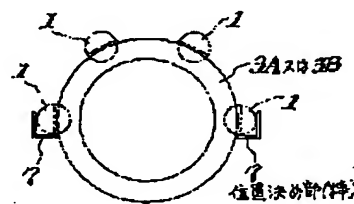
【図1】



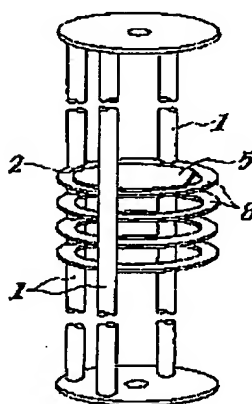
【図2】



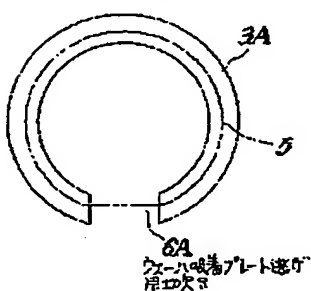
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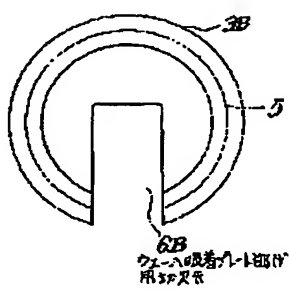
【図6】



【図3】



【図4】



(4)

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